# SIEMENS

# DICOM

## SP

# Configuration

DICOM

# Syngo & Hardcopy Camera

SW Configuration DICOM Camera
Based on "syngo" VB 10 ...

**Document revision level**

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## Software Configuration for DICOM Camera based on SW Syngo VB10A/B

### Menus, Steps

The following is an overview of the individual items described in this chapter:

1. Provide the local camera service with information from the 'Local Host TCP/IP LAN' and 'DICOM General' menus.

2. Define host; set addresses, AET, and port number; and verify the connection using the 'DICOM Print Devices' menu; step 1 and step 2.

3. Enter the DICOM Camera parameter settings in the 'DICOM Print Devices' menu; step 3.

4. Import and/or remove LUTs (Lookup Tables) in the 'DICOM LUT files' menu; step 1.

5. Set LUT and LUT options in 'DICOM LUT files'; step 2. Perform the general configuration for DICOM Cameras.

### Additionally Required Documents

The validity of the DICOM Camera connection depends on the modality and/or application.

Two different kinds of documents are also required:

[G] : The document '<modality>, General Hardcopy Camera Information' contains the list of released DICOM cameras, special hints for this modality, e.g., LUTs and image quality in conjunction with DICOM cameras.

[S] : The document '<modality>, Specific Hardcopy Camera Information <type>' contains DICOM camera data depending on the type and special modality settings, if required.

These documents are required for items 3 and 5, in particular to avoid data mismatch and/or loss of image quality. For this reason, some values are marked with the warning: 'Do not change, unless noted otherwise'. In this case, refer to the modality/application documents [G] and/or [S].

| NOTE | **For additional information see:** |
|---|---|
| | • **http://www-td.med.siemens.de/** |
| | **Siemens Intranet\Med UPTIME Services\** |
| | **Product Information\CAMERAS\"Name of Med Division"\"Name of Image System"\...** |

### Additionally Required Data

• Host name and TCP/IP address of the remote host.

• Application entity title (AET), and port number of the DICOM remote host (DICOM camera).

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- Usually, it is necessary for the DICOM camera to be configured as well. It is recommended that the local camera service be on site at this time.

To configure the DICOM Camera, the AE Title, Port Number and Camera Type must be provided by the local camera service.

## Print Devices

### DICOM Print Device

A DICOM Print Device is a hardcopy camera (also called DICOM camera or DICOM printer) that supports DICOM Basic Print. The expression "DICOM camera" is used in this document.

### Non-DICOM Print Device

| NOTE | **Non-DICOM Camera:** |
|------|------------------------|
| | • **A postscript paper printer is not a DICOM printer.** |
| | • **Syngo does not support SPDI/SPCI.** |

### Description of the Initial DICOM Camera Configuration

Select options in the menu line

• Click on local service

The Siemens Service Software Authentication Platform is displayed

• Please enter the password and click on "OK"

The Syngo Service Software Home Menu Platform is displayed

• Click on "configuration"

The Local Service Configuration List of System Options is displayed

• Select DICOM Print Devices

• Click on "next"

The Local Service Configuration Initial Setup Platform is displayed

• Click on Local Host "TCP/IP LAN"

The local Service Configuration TCP/IP LAN Platform is displayed

Provide the local camera service with the information in the "IP address" field (scroll down menu for IP address).
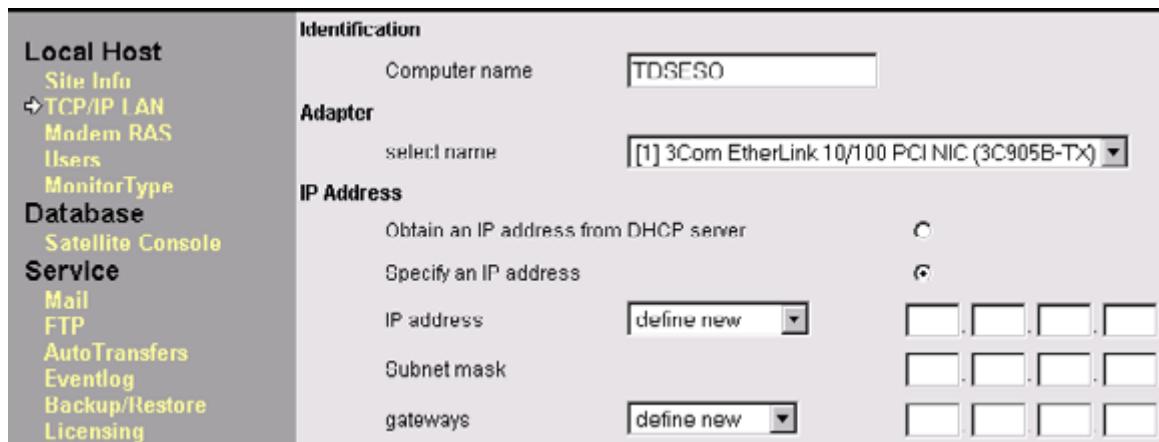
*Fig. 1:    Local Host TCP/IP Address*

- Click on "Finish"

The Local Service Configuration Initial Setup Platform appears

Click on DICOM "General"

The local Application Entity Title Platform appears

Provide the local camera service with the information in the "Print" field (SCU) AE Title
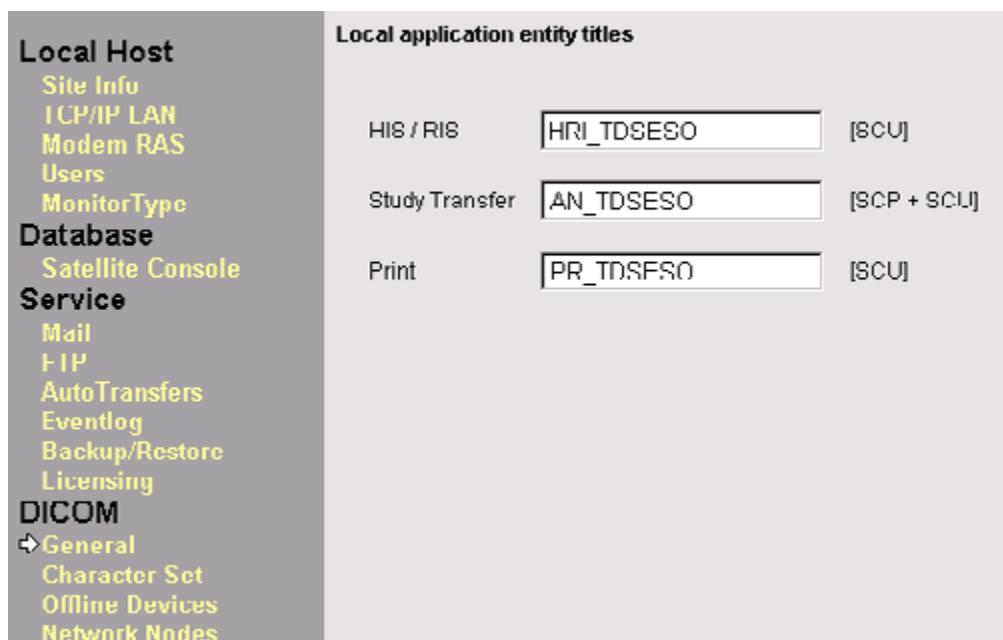


*Fig. 2:    Local Application Entity Title menu*

- Click on "Save"; ">"; "Finish"

- The Local Service Configuration Initial Setup Platform is displayed

- Select DICOM Print Devices

| NOTE | **Deleting a DICOM Camera** |
|------|------|
|  | **If you need to delete a DICOM Camera, the correct procedure is to start with menu step 3 and go back to menu step 1. Otherwise, you will create problems with the filming tab card in the user interface, registry settings, etc.** |

## Step 1- TCP/IP Settings for DICOM Camera
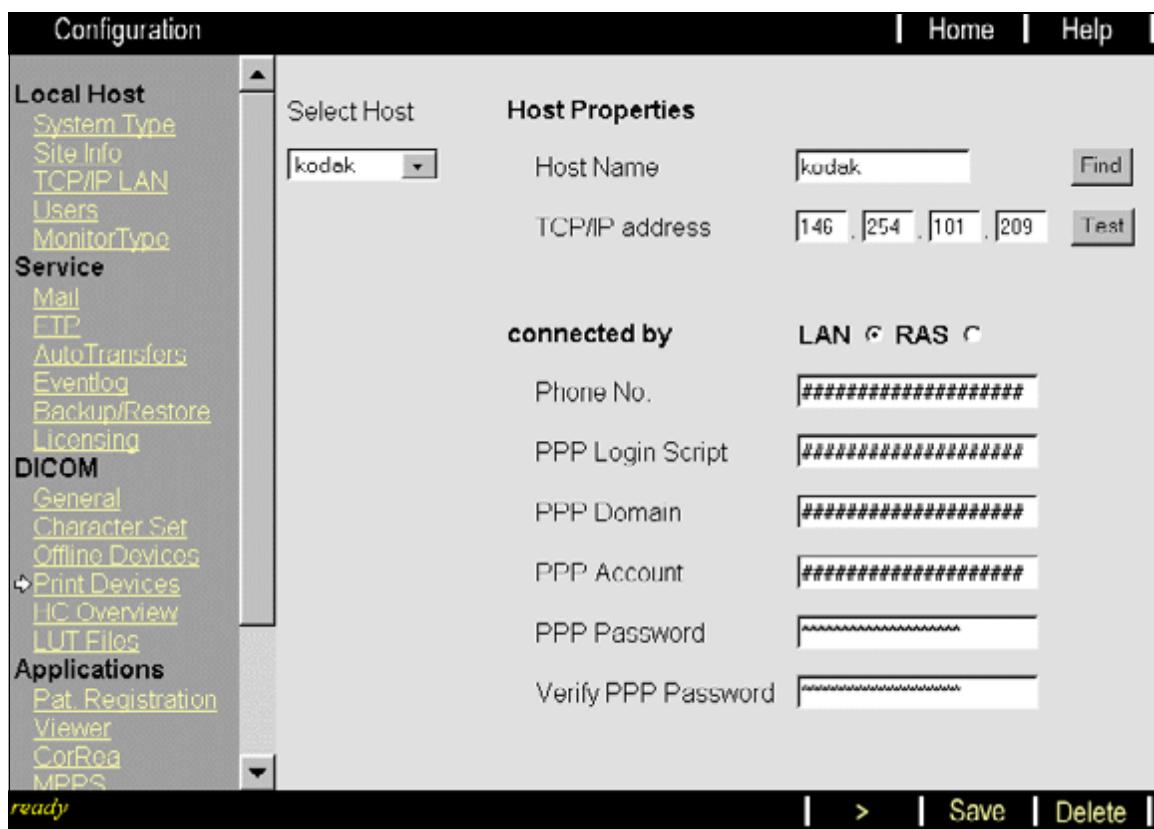


*Fig. 3:     DICOM Print Devices menu - step 1*

| NOTE | For additional information, please press the Help button in the configuration mask and go to |
|------|----------------------------------------------------------------------------------------------|
|      | **DICOM >>Print devices>>steps 1 and 2.** |

### Select Host

Click on the "Select Host" drop-down menu to see if the host name of the DICOM camera is already listed. If so (and the related host properties are correct), you can continue with the next menu.

If the DICOM camera is incorrect or not listed, select "define new" and define the DICOM camera.

### Host Properties

Enter the host name and TCP/IP address of the DICOM camera (provided by the local camera service).

## Host Name

- Enter the host name of the DICOM camera (connected by LAN).

## Find

- Selecting the Find button checks whether the host name is known at the WINS or Domain Name Server (DNS). (Note : 'Find' works for RAS only if the RAS connection has been established previously). If found, the IP address will be entered in the TCP/IP address field. The following response should appear:

    - "Host <name> is successfully resolved." The IP address will be accepted.

## TCP/IP Address

- If no DNS is used, you need to manually enter the IP address into these fields.

## Connected by LAN / RAS

- Select connected by LAN (do not use 'connected by RAS' for a DICOM camera configuration)
- Click on "save"
- Host properties successfully saved
- Click on "OK"; ">"

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## Step 2- DICOM Settings for DICOM Camera
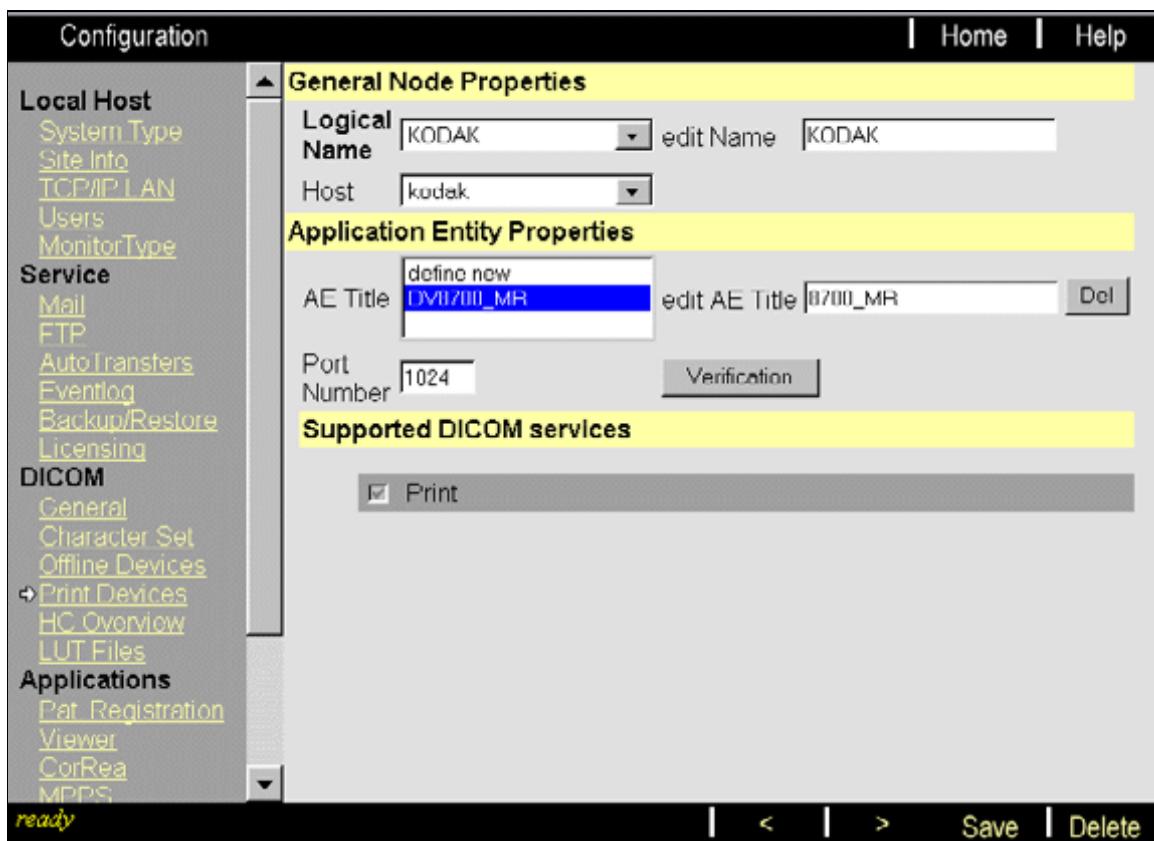


*Fig. 4:     DICOM Print Devices menu - step 2*

| NOTE | For additional information, please press the Help button in the configuration mask and go to |
|------|----------------------------------------------------------------------------------------------|
|      | DICOM >>Print Devices>>steps 1 and 2. |

## General Node Properties

### Logical Name

- The logical name is used only as a link to the next menu (menu step 3). Select the logical name for the DICOM camera.

### Edit Name

- Create or update a logical name for the DICOM camera.

### Host

- Select the host and choose the previously defined host name in the DICOM Print Device Platform for the DICOM camera.

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## Application Entity Properties

### AE Title

- The AETs already configured are shown in this pull-down menu. Select the Application Entity Title for the DICOM camera or define a new one in the 'edit AE Title' field.

### Edit AE Title

- Enter the Application Entity Title of the DICOM camera (provided by the local camera service).

### Port Number

- The port number is the TCP/IP listener port where the DICOM process (defined by the AET) at the DICOM camera is listening. Enter the port number of the DICOM camera (provided by the local camera service) and press the Add button.

### Add / Del

- If you select an AET that is already configured, the Add button will change to the Del button, allowing you to delete this AET, if required.

### Verification

- DICOM Verification is a DICOM service for test purposes. What is called a C-ECHO command (mc3echo) will be transferred to the selected DICOM service, which is defined by the IP address, the port number, and the AET.
  - If the verification is successful, the message "...is responding" appears.
  - If the verification is not successful, the message "...is not responding" appears.

### C-ECHO

- C-ECHO will fail for the following reasons (mc3echo):
  - TCP/IP address, AET, or port number is not configured correctly.
  - The DICOM process at the remote host is not running.
  - Certain products check the IP address or AET of the sending system. If the AET or IP address of the local system is not entered correctly there, DICOM verification will fail.
  - The remote host does not support DICOM Verification as a Service Class Provider (see DICOM Conformance Statement).

### Supported DICOM Services

⇨ Print is selected

- Click on "save"
  - ⇨ DICOM node properties successfully saved
- Click on "OK"; ">"

## Step 3- Camera Parameter Settings
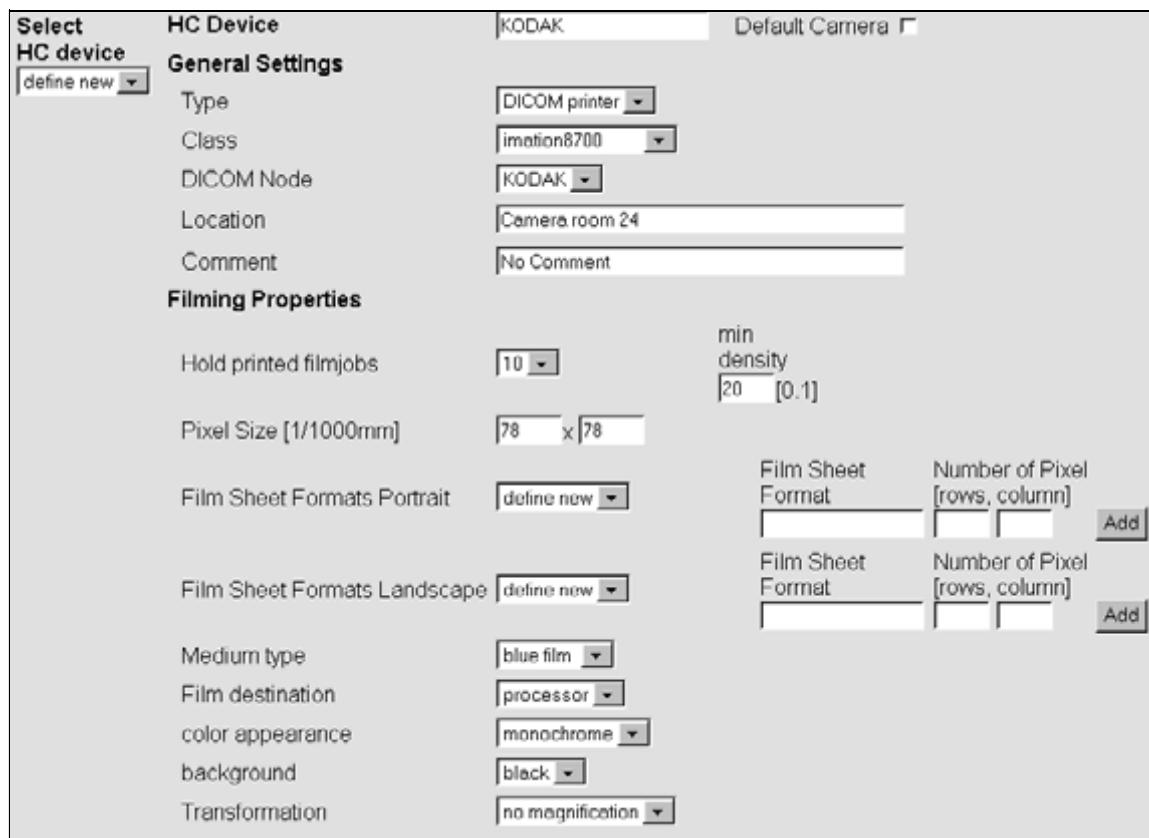


*Fig. 5:     DICOM Print Devices menu - step 3*

| NOTE | **For additional information, please press the Help button in the configuration mask and go to** |
|---|---|
| | **DICOM >>Print Devices>>steps 1 and 2.** |

### Select HC Device

- The DICOM cameras already configured can be selected in this pull-down menu.

### HC Device

- Enter the name of the DICOM Camera which will be displayed in the customer user interface in the Print tab card.

### Default Camera

- When this box is selected, the DICOM camera will be set as the default camera. The other DICOM cameras need to be selected in a pull-down menu in the Print tab card on the customer user interface.

## General Settings

The general setting for each DICOM camera is described in "Specific Hardcopy Camera Information" (see Overview, Additionally Required Documents)

### Type

    ⇨ Here you can select from the following DICOM camera types:

- DICOM printer : Select this item for all DICOM cameras and for cameras connected via the DICOM interface box that support DICOM Basic Print.

- SPCI printer : This item is reserved. Do not use.

- SIMULATE : If the code is available, do not use.

### Class

- A pull-down menu with DICOM cameras will be provided (e.g. imation8700). Select your DICOM camera type. A specific file for this type will be loaded, and the 'Filming Properties' (see below) will be displayed. (for valid class selection, refer to [G] and/or [S])

### DICOM Node

- Here you will get the logical names defined in step 2 of the DICOM camera configuration. Select the appropriate DICOM camera.

### Location

- Enter the location of the DICOM camera. This information will be displayed in this configuration menu only.

### Comment

- Enter comments, such as the help desk phone number of the DICOM camera vendor. This information will be displayed in this configuration menu only.

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## Filming Properties

The displayed settings depend on the selected class (DICOM camera). See also Overview, Additionally Required Documents

### Hold Printed Film Jobs

- The most recent film jobs will remain in the print queue, even after a film has been successfully printed. The number of films in the queue is defined here. default setting = 10; max = 10

### Min Density [1/100 O.D.]

- Set the minimum density value for the film used, default setting = 20; this value can be changed in increments/decrements of 1 (the maximum density value is modality-dependent and is set in the 'LUT files' menu).

### Pixel Size [1/1000 mm]

- This is the pixel dot size specified for this DICOM camera. Do not change, unless otherwise noted.

### Portrait / Landscape Film Sheet Formats

- All formats (media sheet sizes and orientation) specified for this DICOM camera are provided in these fields. Select film sizes and delete only those not available on site. Do not change (modify and/or add film sizes), unless otherwise noted.

### Number of Pixel [rows, columns]

- The number of pixels (rows and columns) specified for this DICOM camera are provided in this field. Do not change (modify Number of Pixels), unless otherwise noted.

### Medium Type

- The possible medium types are provided in this field, default setting = blue film

### Film Destination

- The possible film destination 'magazine' or 'processor' is provided in this field. Select the film destination as specified by the local camera service, default setting = processor

## Color Appearance

- The possible color appearance, 'monochrome' or 'color' is provided in this field. The 'color' setting is a special feature and must be supported by the modality and DICOM camera, default setting = monochrome. Do not change, unless otherwise noted.

## Background

- The background of the film can be set to 'black' or 'white', default setting = black

## Transformation

Normally no transformation; in special cases, an additional transformation is required in the DICOM camera. The following values are possible:

- replicate: the interpolated value is identical to the last pixel value
- bilinear: the interpolated value is between (linear) the last pixel value and the next pixel value
- cubic: the interpolated value is in between (curve) the last pixel value and the next pixel value
- no magnification: leaves the image as is, default setting = no magnification. Do not change, unless otherwise noted
- Click on "save"
- Caution: Please wait for the message "device properties successfully saved".
- Click on "OK"; "Finish"

---

| NOTICE | **Deleting Print Devices** |
|---|---|

**If a DICOM camera is to be deleted from the configuration settings, start the deletion with menu step 3 of the print device setup and go back to menu step 1. Otherwise, the error massage "Option value warning: Invalid node could not be found" will be displayed.**

⇨ **To enter a new DICOM camera, always start with menu step 1 of the setup.**

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# HC Overview

## Overview of the HC Settings

The HC Overview (Hardcopy Overview) menu displays the settings made previously. There is no need for the field service engineer to use this menu, since the settings and tests can also be performed via the 'print device' menu.
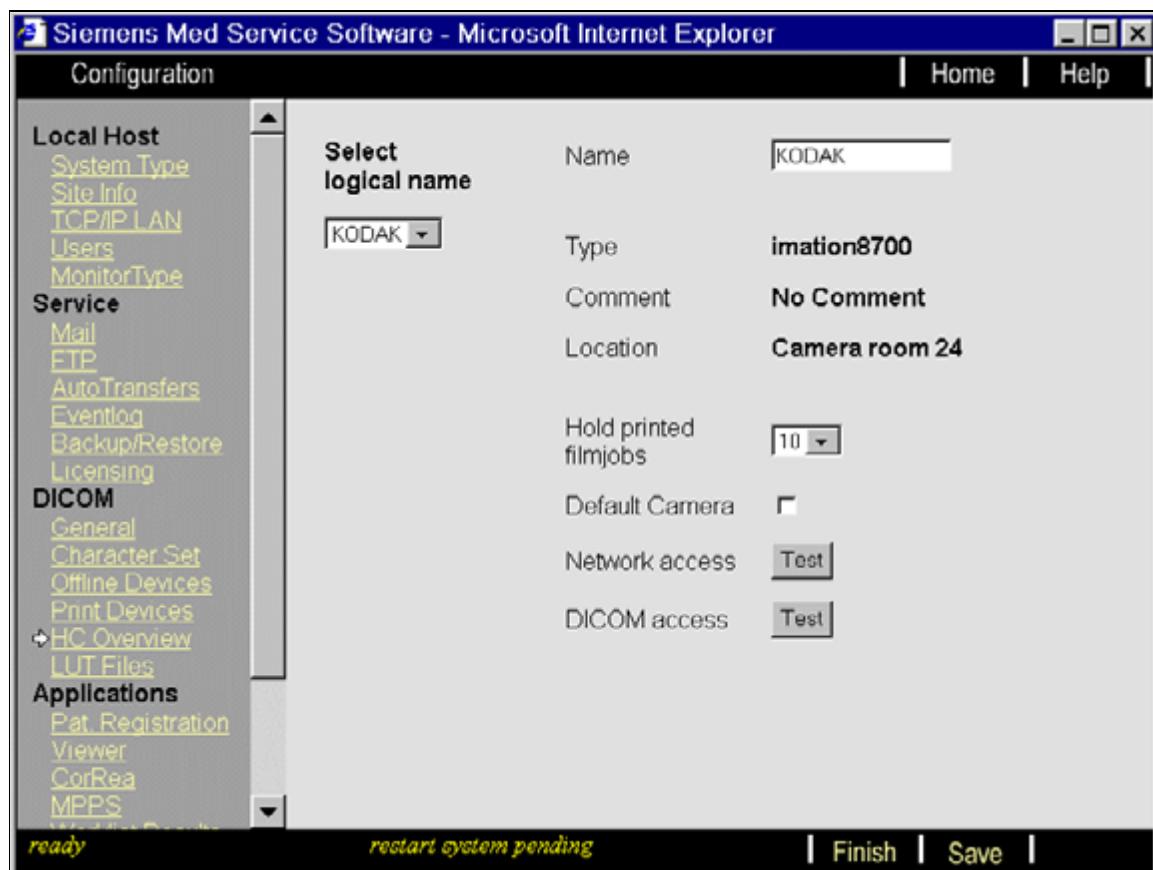


*Fig. 6:     DICOM HC Overview menu*

These menu items were described previously in step 3, DICOM Print Device menu.

| NOTE | **For additional information, please press the Help button in the configuration mask and go to** |
|------|---------------------------------------------------|
|      | **DICOM >>print devices>>steps 1 and 2.** |

## LUT Files

This menu allows you to import, remove, and select LUT files (Look Up Table) for DICOM Basic Print. No tool is available for modifying a lookup table (LUT editor).

### Import of Additional LUT Files
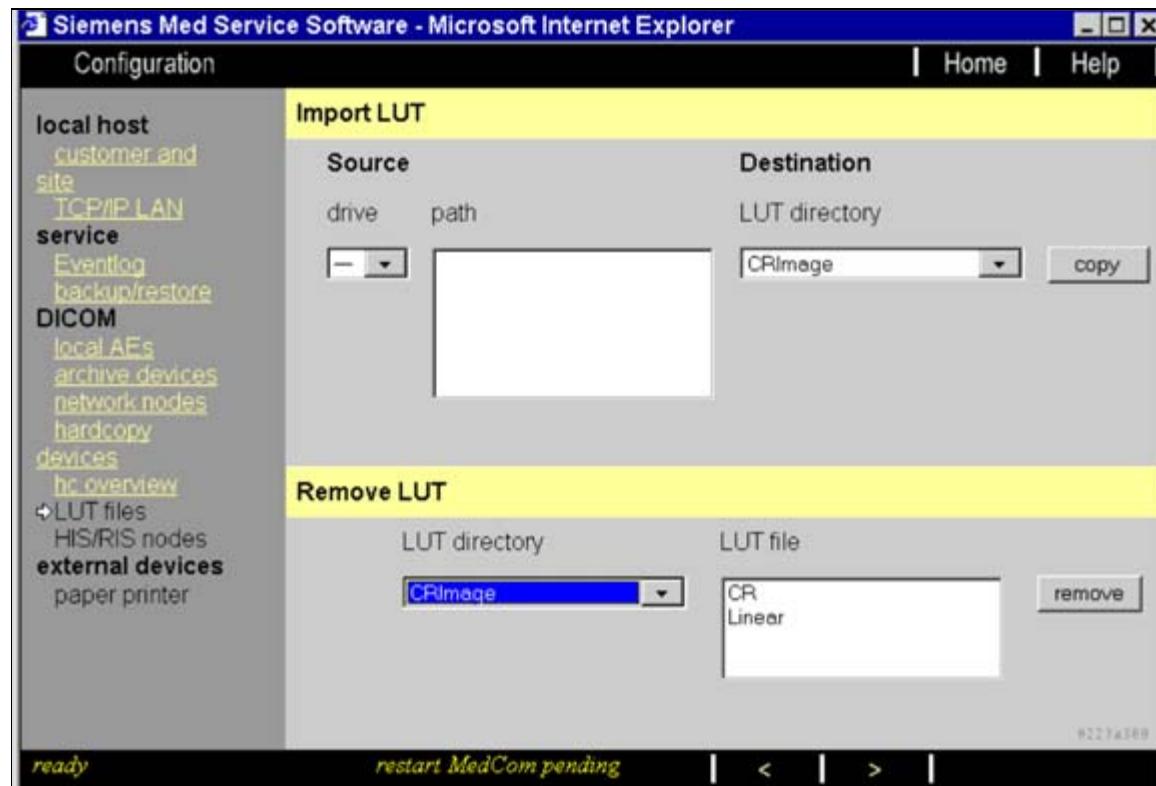


*Fig. 7: DICOM LUT Files menu (import / remove)*

### Import LUT

If new LUT files are available on a removable medium (e.g., floppy or CD) for one or more modalities, these files can be selected on the source drive and copied to the corresponding LUT directories on the local system. Unnecessary LUT files can be removed from LUT directories on the local system

### Source

- Select the drive and path where the appropriate LUT file is located.

### Destination

- Select the destination LUT directory according to image type. Pressing the 'copy' button transfers the selected LUT file.

## Remove LUT

Unneeded LUT files can be removed from LUT directories on the local host by selecting the appropriate LUT file and pressing the 'remove' button.

* Click on ">"

## General LUT Setting Information

| NOTE | **Each modality requires its own LUT setting. Depending on the modality, please refer to "General Hardcopy Camera Information"** |
|------|---------------------------------------------------------------------------------------------------------------------------------|

The image data from the modality to the DICOM camera are transformed / corrected by the LUT's, at least once in the modality and once in the DICOM camera; the LUT must be set on both sides.

The LUT setting will be performed

* for the modality: in this menu with different options (see below)
* for the DICOM camera: with a different mechanism (refer to [S]), i.e.
  - by LUT number or LUT name in the keypad or menu mode
  - by a modality-specific file or default configuration file in menu mode

The LUT selection depends on

* the modality: for each image per film sheet on the image type
* the DICOM camera: for each film sheet on a different mechanism, i.e.
  - modality independent (fixed LUT)
  - depending on modality by the calling AET
  - depending on the required port number

## Menu Options

There are 3 possible settings for image presentation

1. Usage of Presentation LUT disabled: The image data will be corrected by a Correction LUT (also called modality-specified LUT or GG LUT). In this case, each DICOM camera has to be set to LINEAR LUT.

2. Use of Presentation LUT enabled AND DICOM p-Value Interface supported by all connected cameras: The image data will be corrected by a Presentation LUT. In this case, each DICOM camera has to be set to GSDF (Gray Scale Standard Display Function). Note: it is not possible to mix cameras that support GSDF with those that do not!

3. Use of Presentation LUT enabled AND DICOM p-Value Interface not supported by all connected cameras: The image data will be corrected by a Presentation LUT AND a Correction LUT. In this case, each DICOM camera has to be set to LINEAR LUT (the GSDF will be performed in the modality instead of in the DICOM camera).

| NOTE | **The options "Use of Presentation LUT enabled with DICOM p-value interface supported/not supported by all connected cameras" is a work in progress** |
|------|------|

## LUT Settings

The following are the default settings for "Use of Presentation LUT disabled." Please do not change, unless otherwise noted.

*Fig. 8:    Use of Presentation LUT disabled*

### Correction LUT / Presentation LUT

- For an explanation, see Menu Options (above).  Special settings depend on the modality (see Overview, Additionally Required Documents) (Note: 'Presentation LUT' and 'Correction LUT' are logical names and do not correspond to each other with the different options; i.e. both Presentation LUTs in the 2nd and 3rd option case can have the same name but different contents).

### Max Density

- This value is required for each LUT and is imported together with the LUT (do not change this default value, unless otherwise noted). This value will be used together with 'Overall maximum density' to scale the image presentation for each image per film sheet (Hint : the Min Density value will be set once in the 'Print device menu').

### Overall Maximum Density

- This value will be used to set the maximum required density on the film. Default setting = 3.00. (The overall maximum density value has to be equal to or higher than the "Max Density Entries" for the different image types).

### Interpolation for Printing

- The complete film sheet is calculated in the modality and then be sent to the DICOM camera (page mode). To fit the images into this virtual film sheet, pixel interpolation is required. Do not change, unless otherwise noted. The following values are possible: replicate: the interpolated value is identical to the last pixel value bilinear: the interpolated value is between (linear) the last pixel value and the next pixel value; cubic: the interpolated value is between (curve) the last pixel value and the next pixel value

### Mode

- The smoothing type factor can be selected for the cubic interpolation algorithm only (smoothing factors are 0, 2, 3, 4). Do not change, unless otherwise noted.
- Click on "save" after making the changes
- Click on "finish"
- Click on "Home"; the system restarts automatically

| NOTE | This may take some time. |
| --- | --- |

If the message "restart Syngo pending" appears in the bottom status line; an application restart is automatic after the "HOME" button is pressed.

If the message "shutdown Syngo pending" appears in the bottom status line; a system restart is automatic after the "HOME" button is pressed.

Confirm the warnings with "OK."

## Standard LUT Files for Siemens Modalities

Based on the VB10x Syngo software, only the standard LUTs are implemented. The following LUTs are the default standard LUTs.

| Image type | Correction LUT | Max Density |
| --- | --- | --- |
| CRImage | cr | 3.00 |
| CTImage | CTLUT (*1) | 2.80 |
| DXImage | Linear | 3.00 |
| USMFImage | USMF | 2.40 |
| MRImage | MR1 (*2) | 3.00 |
| USImage | us | 2.40 |
| SCImage | sc | 2.80 |
| SAOverlay | SAOverlay | 3.00 |
| SACurve | SACurve | 3.00 |
| XAImage | xa | 3.00 |
| XRImage | xrf | 3.00 |
| XABiPlaneImage | xabipl | 3.00 |
| NMImage | NM | 3.00 |

DICOM default setting, Siemens LUT files

*1 and *2, see Non-Standard LUT files for Siemens Modalities

## Non-Standard LUT Files for Siemens Modalities

For CT systems, additional LUTs are available from the BU.

"Image type" CTImage "Correction LUT" CT LUT (*1)

| | |
| --- | --- |
| CTLUT: | Standard LUT; default LUT for all wet DICOM cameras; adapts Dmin of 0.2 |
| CT2 vs. CTLUT: | Dark area = less contrast; darker; softer; white area = more contrast |
| CT3 vs. CT2: | Dark area = less contrast; darker; softer; white area = more contrast |
| CT4 vs. CTLUT: | Dark area = more contrast; darker; sharper; white area: no changes |
| CT5 vs. CTLUT: | Brighter; no change of contrast for large window width; more contrast for head images (small window width) |
| CT6 vs. CTLUT: | Brighter than CT5; white area = less contrast |

| | |
|---|---|
| cthead1: | LUT for head images, images smoother, impression of head images of Somatom Emotion Duo similar to Somatom Plus4 |
| cthead2 vs. cthead1: | Images smoother; but sharper impression than Somatom Plus4 images |
| CT015: | Adapts Dmin. of 0.15 (for DICOM cameras not supported by Dmin. command) |
| CT017: | Adapts Dmin. of 0.17 (for DICOM cameras not supported by Dmin. command) |
| CTLUTdry; | Default LUT for dry DICOM cameras; adapts Dmin of 0.22 |
| CTLung | LUT for lung images |

For MR systems, some additional LUTs are available from the BU.


"Image type" MRImage "Correction LUT" MR1LUT (*2)

MR1 LUT (Standard LUT) and max. density 2.80 - 3.00 (recommended 3.00)

MR2 LUT (LUT for "softer contrast) and max. density 2.80 - 3.00 (recommended 3.00)

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